

# Capitalization Rate Study

January 2016

Oklahoma Tax Commission

Ad Valorem Division

Public Service Section

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April 30, 2016

The Public Service Section of the Ad Valorem Division acknowledges the contribution of those individuals taking part in the development of our capitalization rates for 2016. Through the Capitalization Rate Conference, the draft posted on our website and the following comment period, participation has been helpful and positive.

This is an ongoing process, concepts in valuation methodology change, continuing the education process. It is our intent to be as transparent as possible while being receptive to any input given.

We look forward to your continued participation in this process.

Sincerely,

Oklahoma Tax Commission  
Ad Valorem Division



Vicki L. Duncan,  
Revenue Administrator  
Public Service Section

# EXECUTIVE SUMMARY

## **Executive Summary**

The income approach to value converts projected future income or cash flow into an estimate of present value. The accuracy of this approach is no greater than the validity of the assumptions used to estimate the key variables, particularly the capitalization rate variable. The mathematical techniques used in the approach convert those assumptions into an estimate of current market value.

This booklet contains a study of each of the eight state assessed industry groups in Oklahoma. Industry data was gathered by group as identified by Value Line Investment Survey published from the period of November 2015 through January 2016.

Generally accepted appraisal procedures were used to estimate the cost of capital for debt and equity. The long term debt cost is the cost for a particular risk class of debt on the lien date. The equity rate reflects the rate of return or compensation that will satisfy the risk that a prospective purchaser would assume by investing in the property.

### ***Authority for Valuation***

The Oklahoma Tax Commission, Ad Valorem Division, is charged with the responsibility for the valuation of Railroad, Air Carrier, and Public Service Corporation property in accordance with Title 68, Oklahoma Statutes, Section 2808. The term "public service" includes electric companies, fluid or product pipeline companies, gas distribution and transmission companies, telecommunication companies, and water companies.

### ***Band of Investment, Capital Structure***

A representative capital structure is developed for each industry using the market value of equity and the book value of long term debt. Using Value Line Investment Survey the market value of equity can be calculated by multiplying the number of shares outstanding by the listed stock price, or by utilizing the given market capitalization number already calculated. The debt components are book amounts unless market amounts are readily available and predetermined to be significantly different. Preferred stock was excluded in the calculations for all industry types.

The rates of debt and equity capital are weighted by the respective amounts of such capital deemed most likely to be employed by a prospective buyer. The result is a representative or typical capital structure of an industry group of companies not that of the present owner.

### ***Cost of Debt***

Cost of debt was calculated as the twelve month bond yield average from Mergent Bond Record for public utility and industrial bonds utilizing that bond rating perceived as typical for each industry.

## Executive Summary

### ***Cost of Capital***

Equity rate calculations were derived upon review of Discounted Cash Flow, Capital Asset Pricing Model (CAPM), and Earnings Price Ratio.

Discounted Cash Flow (Gordon Growth Model) allows for the calculation of two rates within its model utilizing the dividend yield, dividend growth rate estimates and earnings growth rate estimates as listed in Value Line Investment Survey. Cost of capital being calculated for dividends by adding the dividend yield and the dividend estimate. Similarly the cost of capital for earnings is calculated by adding the dividend yield and the earnings estimate. No calculation is utilized where yield or growth estimates for a given company are not available as provided by our sources.

Capital Asset Pricing Model (CAPM) in the application of the CAPM, the most sensitive component affecting the outcome is the estimate of the beta statistic. A choice of time frames and frequencies of measurement in the calculation of the beta can produce significantly different results. Another factor in the use of beta is the choice of whether to use an unadjusted beta or a beta adjusted to reflect the fact that betas revert to the mean over time. For this study the company levered betas as developed and presented in The Value Line Investment Survey for the selected industry groups are used.

Earnings Price Ratios (E/P Ratio) Utilizing Value Line Investment Survey for the selected industry groups, the E/P Ratio was calculated with the projected earnings divided by the recent price.

### ***Flotation Costs***

Flotation costs are those costs associated with the issuance of new securities and include both the underwriting spread and the costs incurred by the issuing company from the offering. Financial theory suggests and evidence supports that firms do not typically issue new common equity as a matter of common practice. Therefore in determining a capitalization rate, no adjustment will be made in the capitalization rate or the income stream for hypothetical flotation costs. Flotation costs actually incurred may be accounted for in the income stream.

### ***Utilization of Other Studies and Data***

Valuation staff has considered and where appropriate utilized data and capitalization studies submitted by assessed and interested parties in the development of the derived rates.

The capitalization rates published in this study are intended to be applied to the unitary operations of those companies subject to central valuation and assessment by the Oklahoma State Board of Equalization.

# Industry Capitalization Rate Summary

<i>Industry</i>	<i>Equity Rate</i>	<i>Debt Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>	
<i>Airline</i>						
	<i>Cargo</i>	13.00%	4.96%	89.36%	10.64%	12.14%
	<i>Passenger</i>	13.20%	4.96%	77.09%	22.91%	11.31%
<i>Electric</i>		10.10%	5.03%	59.59%	40.41%	8.05%
<i>Fluid Pipeline (Petroleum Integrated)</i>		12.40%	4.96%	86.05%	13.95%	11.36%
<i>Gas Distribution (Natural Gas Utility)</i>		9.80%	5.03%	65.65%	34.35%	8.16%
<i>Gas Transmission (Natural Gas Diversified)</i>		12.00%	4.96%	73.13%	26.87%	10.11%
<i>Oil/Gas Distribution</i>		13.10%	4.96%	55.07%	44.93%	9.44%
<i>Pipeline MLPs</i>		13.50%	4.96%	63.57%	36.43%	10.39%
<i>Railroad</i>		13.15%	4.96%	82.92%	17.08%	11.75%
<i>Telecommunications Services</i>		12.55%	4.96%	63.40%	36.60%	9.77%
<i>Telecommunications Utility</i>		13.30%	5.03%	40.28%	59.72%	8.36%
<i>Water</i>		9.85%	5.03%	66.59%	33.41%	8.24%

# Airline Industry

## 2016 Capitalization Rate Study Airline Industry Notes

- Recognizing the different operational services as provided by this industry group, it was broken out into two segments, cargo and passenger service.
- From the passenger service segment, Bristow Group, Inc. was excluded as their core business involves helicopter transportation of personnel from onshore bases to offshore drilling rigs, platforms, and other installations. WestJet Airlines Ltd. was excluded due to Value Line information listed in Canadian dollars.
- Staff considered capitalization studies gathered and submitted by:

No Submissions

- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Airline</i>				
<i>Cargo</i>	13.00%	89.36%	10.64%	12.14%
<i>Passenger</i>	13.20%	77.09%	22.91%	11.31%

# Industry Equity Rate Summary

## *Airline*

### *Cargo*

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CAPM Ex Post Equity Rate	10.01%
CAPM Ex Ante Equity Rate	13.79%
DCF (Dividend) Equity Rate	13.60%
DCF (Earnings) Equity Rate	14.60%
Earnings Price Ratio	10.81%

### *Passenger*

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CAPM Ex Post Equity Rate	9.99%
CAPM Ex Ante Equity Rate	13.77%
DCF (Dividend) Equity Rate	26.75%
DCF (Earnings) Equity Rate	15.40%
Earnings Price Ratio	14.23%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Airline</i>					
<i>Cargo</i>	9.43%	12.92%	1.08	10.01%	13.79%
<i>Passenger</i>	9.43%	12.92%	1.08	9.99%	13.77%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Airline</b>								
<b>Cargo</b>	Atlas Air Worldwide Holdings, Inc.	B+	1,000,000,000	0.00%	0.00%	3.00%		
	FedEx Corporation	A++	45,600,000,000	0.60%	17.00%	15.00%	17.60%	15.60%
	United Parcel Service, Inc.	A	92,000,000,000	3.10%	6.50%	10.50%	9.60%	13.60%
<b>Median</b>			45,600,000,000				13.60%	14.60%
<b>Arithmetic Mean</b>			46,200,000,000				13.60%	14.60%
<b>Passenger</b>								
	Alaska Air Group, Inc.	A	9,800,000,000	1.00%	17.00%	9.50%	18.00%	10.50%
	Allegiant Travel Company	B++	3,100,000,000	0.60%	0.00%	19.00%		19.60%
	American Airlines Group	B	26,700,000,000	0.90%	0.00%	0.00%		
	Copa Holdings S.A.	B+	2,100,000,000	6.90%	4.00%	8.50%	10.90%	15.40%
	Delta Air Lines, Inc.	B+	37,600,000,000	1.40%	45.00%	16.00%	46.40%	17.40%
	Hawaiian Holdings, Inc.	B	1,900,000,000	0.00%	0.00%	12.50%		
	JetBlue Airways Corp.	B+	7,900,000,000	0.00%	0.00%	14.50%		
	SkyWest, Inc.	B	1,000,000,000	0.80%	0.00%	11.00%		11.80%
	Southwest Airlines	A	30,500,000,000	0.70%	31.00%	17.00%	31.70%	17.70%
	Spirit Airlines, Inc.	B++	2,500,000,000	0.00%	0.00%	21.50%		
United Continental Holdings, Inc.	B	21,400,000,000	0.00%	0.00%	24.50%			
<b>Median</b>			7,900,000,000				24.85%	16.40%
<b>Arithmetic Mean</b>			13,136,363,636				26.75%	15.40%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Airline</b>						
<b>Cargo</b>	Atlas Air Worldwide Holdings	B+	1,000,000,000	40.27	6.25	15.52%
	FedEx Corporation	A++	45,600,000,000	161.41	14.00	8.67%
	United Parcel Service, Inc.	A	92,000,000,000	103.14	8.50	8.24%
<b>Median</b>			45,600,000,000			8.67%
<b>Arithmetic Mean</b>			46,200,000,000			10.81%
<b>Passenger</b>						
<b>Passenger</b>	Alaska Air Group, Inc.	A	9,800,000,000	77.54	8.50	10.96%
	Allegiant Travel Company	B++	3,100,000,000	186.57	14.45	7.75%
	American Airlines Group	B	26,700,000,000	42.30	10.00	23.64%
	Copa Holdings S.A.	B+	2,100,000,000	48.79	8.00	16.40%
	Delta Air Lines, Inc.	B+	37,600,000,000	47.77	6.75	14.13%
	Hawaiian Holdings, Inc.	B	1,900,000,000	35.53	4.00	11.26%
	JetBlue Airways Corp.	B+	7,900,000,000	24.95	2.75	11.02%
	SkyWest, Inc.	B	1,000,000,000	19.50	2.75	14.10%
	Southwest Airlines	A	30,500,000,000	45.93	5.00	10.89%
	Spirit Airlines, Inc.	B++	2,500,000,000	35.26	5.50	15.60%
United Continental Holdings, Inc.	B	21,400,000,000	57.38	11.90	20.74%	
<b>Median</b>			7,900,000,000			14.10%
<b>Arithmetic Mean</b>			13,136,363,636			14.23%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Airline</b>							
<b>Cargo</b>	Atlas Air Worldwide Holdings	B+	1,000,000,000	1,642,400,000	1.64	37.84%	62.16%
	FedEx Corporation	A++	45,600,000,000	7,244,000,000	0.16	86.29%	13.71%
	United Parcel Service, Inc.	A	92,000,000,000	10,044,000,000	0.11	90.16%	9.84%
<b>Median</b>			45,600,000,000	7,244,000,000	0.16	86.29%	13.71%
<b>Arithmetic Mean</b>			46,200,000,000	6,310,133,333	0.64	71.43%	28.57%
<b>Weighted Average</b>			76,077,633,478	9,062,170,274		89.36%	10.64%
<b>Passenger</b>							
<b>Passenger</b>	Alaska Air Group, Inc.	A	9,800,000,000	593,000,000	0.06	94.29%	5.71%
	Allegiant Travel Company	B++	3,100,000,000	566,200,000	0.18	84.56%	15.44%
	American Airlines Group	B	26,700,000,000	18,849,000,000	0.71	58.62%	41.38%
	Copa Holdings S.A.	B+	2,100,000,000	997,700,000	0.48	67.79%	32.21%
	Delta Air Lines, Inc.	B+	37,600,000,000	7,096,000,000	0.19	84.12%	15.88%
	Hawaiian Holdings, Inc.	B	1,900,000,000	818,600,000	0.43	69.89%	30.11%
	JetBlue Airways Corp.	B+	7,900,000,000	1,744,000,000	0.22	81.92%	18.08%
	SkyWest, Inc.	B	1,000,000,000	1,842,900,000	1.84	35.18%	64.82%
	Southwest Airlines	A	30,500,000,000	2,381,000,000	0.08	92.76%	7.24%
	Spirit Airlines, Inc.	B++	2,500,000,000	500,100,000	0.20	83.33%	16.67%
United Continental Holdings, Inc.	B	21,400,000,000	10,672,000,000	0.50	66.72%	33.28%	
<b>Median</b>			7,900,000,000	1,744,000,000	0.22	81.92%	18.08%
<b>Arithmetic Mean</b>			13,136,363,636	4,187,318,182	0.44	74.47%	25.53%
<b>Weighted Average</b>			25,593,010,381	7,606,692,595		77.09%	22.91%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<i>Airline, Selected Comparables</i>						
<i>Cargo</i>	Atlas Air Worldwide Holdings	1.65	1.65	1.60	1.35	1.35
	FedEx Corporation	1.00	1.00	1.05	1.05	1.05
	United Parcel Service, Inc.	0.85	0.85	0.90	0.90	0.85
<i>Median</i>		1.00	1.00	1.05	1.05	1.05
<i>Arithmetic Mean</i>		1.17	1.17	1.18	1.10	1.08
<i>Passenger</i>	Alaska Air Group, Inc.	1.15	1.10	1.05	1.05	1.05
	Allegiant Travel Company	0.80	0.75	0.65	0.70	0.70
	American Airlines Group					1.25
	Copa Holdings S.A.				0.95	1.10
	Delta Air Lines, Inc.	1.40	1.40	1.30	1.15	1.20
	Hawaiian Holdings, Inc.	1.10	1.10	1.10	1.00	1.05
	JetBlue Airways Corp.	1.25	1.25	1.25	1.05	1.10
	SkyWest, Inc.	1.10	1.15	1.10	1.00	1.15
	Southwest Airlines	1.00	1.00	1.05	1.05	1.05
	Spirit Airlines, Inc.			1.00	1.15	1.20
	United Continental Holdings, Inc.	1.70	1.60	1.40	1.15	1.05
<i>Median</i>		1.13	1.13	1.10	1.05	1.10
<i>Arithmetic Mean</i>		1.19	1.17	1.10	1.03	1.08

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<b>2012</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2013</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2014</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2015</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2016</b> <i>Value Line</i> <i>Levered Beta</i>
<i>Airline, Value Line</i>						
	Alaska Air Group, Inc.	1.15	1.10	1.05	1.05	1.05
	Allegiant Travel Company	0.80	0.75	0.65	0.70	0.70
	American Airlines Group					1.25
	Atlas Air Worldwide Holdings	1.65	1.65	1.60	1.35	1.35
	Bristow Group, Inc.	1.30	1.25	1.25	1.05	1.05
	Copa Holdings S.A.	1.00	0.95	0.95	0.95	1.10
	Delta Air Lines, Inc.	1.40	1.40	1.30	1.15	1.20
	FedEx Corporation	1.00	1.00	1.05	1.05	1.05
	Hawaiian Holdings, Inc.	1.10	1.10	1.10	1.00	1.05
	JetBlue Airways Corp.	1.25	1.25	1.25	1.05	1.10
	SkyWest, Inc.	1.10	1.15	1.10	1.00	1.15
	Southwest Airlines	1.00	1.00	1.05	1.05	1.05
	Spirit Airlines, Inc.			1.00	1.15	1.20
	United Continental Holdings, Inc.	1.70	1.60	1.40	1.15	1.05
	United Parcel Service, Inc.	0.85	0.85	0.90	0.90	0.85
	WestJet Airlines Ltd.				0.75	0.65
<b>Median</b>		1.10	1.10	1.08	1.05	1.05
<b>Arithmetic Mean</b>		1.18	1.16	1.12	1.02	1.05

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Electric Industry

## 2016 Capitalization Rate Study Electric Industry Notes

- No exclusions were made to the Value Line Electric (Central) Industry segment. Integrys Energy Group, Inc. was acquired by Wisconsin Energy Corporation, now listed as WEC Energy Group, Inc.
- Staff considered capitalization studies gathered and submitted by:
  - No Submissions
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Electric</i>	10.10%	59.59%	40.41%	8.05%

# Industry Equity Rate Summary

*Electric*

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CAPM Ex Post Equity Rate	7.84%
CAPM Ex Ante Equity Rate	10.52%
DCF (Dividend) Equity Rate	9.03%
DCF (Earnings) Equity Rate	9.43%
Earnings Price Ratio	7.54%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Electric</i>	9.43%	12.92%	0.77	7.84%	10.52%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Electric</b>								
	Allete, Inc.	A	2,500,000,000	4.10%	3.00%	6.50%	7.10%	10.60%
	Alliant Energy Corp.	A	6,900,000,000	3.60%	4.50%	6.00%	8.10%	9.60%
	Ameren Corp.	A	10,400,000,000	4.00%	3.50%	7.00%	7.50%	11.00%
	American Electric Power Company, Inc.	A	27,000,000,000	4.10%	5.00%	5.00%	9.10%	9.10%
	CenterPoint Energy, Inc.	B+	7,000,000,000	6.30%	5.00%	0.00%	11.30%	
	Cleco Corporation	A	3,100,000,000	3.10%	4.00%	0.50%	7.10%	3.60%
	CMS Energy Corporation	B++	9,800,000,000	3.50%	6.50%	5.50%	10.00%	9.00%
	DTE Energy Company	B++	14,000,000,000	3.70%	5.50%	5.00%	9.20%	8.70%
	Entergy Corporation	B++	12,000,000,000	5.10%	2.50%	-1.00%	7.60%	4.10%
	Great Plains Energy Incorporated	B+	4,100,000,000	4.00%	6.00%	5.00%	10.00%	9.00%
	ITC Holdings Corp.	B++	5,900,000,000	2.10%	12.50%	12.00%	14.60%	14.10%
	MGE Energy Inc.	A	1,500,000,000	2.80%	4.00%	7.00%	6.80%	9.80%
	OGE Energy Corp.	A	4,900,000,000	4.70%	10.00%	3.00%	14.70%	7.70%
	Otter Tail Corporation	B+	1,000,000,000	4.70%	1.50%	9.00%	6.20%	13.70%
	The Empire District Electric Company	B++	1,000,000,000	4.60%	2.00%	3.00%	6.60%	7.60%
	Vectren Corp.	A	3,400,000,000	3.80%	4.00%	9.50%	7.80%	13.30%
	WEC Energy Group, Inc.	A+	16,000,000,000	3.90%	8.50%	6.00%	12.40%	9.90%
	Westar Energy, Inc.	B++	5,900,000,000	3.50%	3.00%	6.00%	6.50%	9.50%
<b>Median</b>			5,900,000,000				7.95%	9.50%
<b>Arithmetic Mean</b>			7,577,777,778				9.03%	9.43%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Electric</b>						
	Allete, Inc.	A	2,500,000,000	50.15	4.00	7.98%
	Alliant Energy Corp.	A	6,900,000,000	60.69	4.55	7.50%
	Ameren Corp.	A	10,400,000,000	42.74	3.50	8.19%
	American Electric Power Company, Inc.	A	27,000,000,000	55.88	4.25	7.61%
	CenterPoint Energy, Inc.	B+	7,000,000,000	16.34	1.35	8.26%
	Cleco Corporation	A	3,100,000,000	51.90	2.75	5.30%
	CMS Energy Corporation	B++	9,800,000,000	35.38	2.25	6.36%
	DTE Energy Company	B++	14,000,000,000	80.62	5.75	7.13%
	Entergy Corporation	B++	12,000,000,000	66.56	5.25	7.89%
	Great Plains Energy Incorporated	B+	4,100,000,000	26.56	2.00	7.53%
	ITC Holdings Corp.	B++	5,900,000,000	38.49	2.75	7.14%
	MGE Energy Inc.	A	1,500,000,000	43.37	3.15	7.26%
	OGE Energy Corp.	A	4,900,000,000	24.62	2.25	9.14%
	Otter Tail Corporation	B+	1,000,000,000	26.56	2.25	8.47%
	The Empire District Electric Company	B++	1,000,000,000	22.81	1.75	7.67%
	Vectren Corp.	A	3,400,000,000	41.70	3.25	7.79%
	WEC Energy Group, Inc.	A+	16,000,000,000	50.50	3.50	6.93%
	Westar Energy, Inc.	B++	5,900,000,000	41.40	3.10	7.49%
<b>Median</b>			5,900,000,000			7.57%
<b>Arithmetic Mean</b>			7,577,777,778			<b>7.54%</b>

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<i>Electric</i>							
	Allete, Inc.	A	2,500,000,000	1,549,000,000	0.62	61.74%	38.26%
	Alliant Energy Corp.	A	6,900,000,000	3,855,800,000	0.56	64.15%	35.85%
	Ameren Corp.	A	10,400,000,000	5,981,000,000	0.58	63.49%	36.51%
	American Electric Power Company, Inc.	A	27,000,000,000	17,600,000,000	0.65	60.54%	39.46%
	CenterPoint Energy, Inc.	B+	7,000,000,000	7,662,000,000	1.09	47.74%	52.26%
	Cleco Corporation	A	3,100,000,000	1,207,200,000	0.39	71.97%	28.03%
	CMS Energy Corporation	B++	9,800,000,000	8,014,000,000	0.82	55.01%	44.99%
	DTE Energy Company	B++	14,000,000,000	8,856,000,000	0.63	61.25%	38.75%
	Entergy Corporation	B++	12,000,000,000	13,080,000,000	1.09	47.85%	52.15%
	Great Plains Energy Incorporated	B+	4,100,000,000	3,763,500,000	0.92	52.14%	47.86%
	ITC Holdings Corp.	B++	5,900,000,000	3,709,900,000	0.63	61.40%	38.60%
	MGE Energy Inc.	A	1,500,000,000	392,100,000	0.26	79.28%	20.72%
	OGE Energy Corp.	A	4,900,000,000	2,645,500,000	0.54	64.94%	35.06%
	Otter Tail Corporation	B+	1,000,000,000	498,300,000	0.50	66.74%	33.26%
	The Empire District Electric Company	B++	1,000,000,000	863,000,000	0.86	53.68%	46.32%
	Vectren Corp.	A	3,400,000,000	1,522,700,000	0.45	69.07%	30.93%
	WEC Energy Group, Inc.	A+	16,000,000,000	8,727,000,000	0.55	64.71%	35.29%
	Westar Energy, Inc	B++	5,900,000,000	2,941,900,000	0.50	66.73%	33.27%
<i>Median</i>			5,900,000,000	3,736,700,000	0.60	62.62%	37.38%
<i>Arithmetic Mean</i>			7,577,777,778	5,159,383,333	0.65	61.80%	38.20%
<i>Weighted Average</i>			12,961,290,323	8,791,312,243		59.59%	40.41%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<b>2012</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2013</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2014</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2015</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2016</b> <i>Value Line</i> <i>Levered Beta</i>
<i>Electric, Selected Comparables</i>						
	Allete, Inc.	0.70	0.70	0.75	0.80	0.80
	Alliant Energy Corp.	0.75	0.70	0.75	0.80	0.80
	Ameren Corp.	0.80	0.80	0.80	0.75	0.75
	American Electric Power Company, Inc.	0.70	0.65	0.70	0.70	0.70
	CenterPoint Energy, Inc.	0.80	0.75	0.80	0.75	0.85
	Cleco Corporation	0.70	0.65	0.70	0.80	0.75
	CMS Energy Corporation	0.75	0.75	0.70	0.70	0.75
	DTE Energy Company	0.75	0.75	0.80	0.75	0.75
	Energy Corporation	0.70	0.70	0.70	0.70	0.70
	Great Plains Energy Incorporated	0.75	0.75	0.85	0.85	0.85
	ITC Holdings Corp.	0.80	0.75	0.75	0.65	0.70
	MGE Energy Inc.	0.60	0.60	0.65	0.70	0.75
	OGE Energy Corporation	0.80	0.75	0.85	0.90	0.95
	Otter Tail Corporation	0.90	0.90	0.95	0.90	0.85
	The Empire District Electric Company	0.70	0.65	0.70	0.70	0.70
	Vectren Corp.	0.70	0.70	0.70	0.80	0.75
	WEC Energy Group, Inc.	0.65	0.60	0.65	0.65	0.70
	Westar Energy, Inc.	0.75	0.70	0.75	0.75	0.75
<b>Median</b>		0.75	0.70	0.75	0.75	0.75
<b>Arithmetic Mean</b>		0.74	0.71	0.75	0.76	0.77

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<b>2012</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2013</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2014</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2015</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2016</b> <i>Value Line</i> <i>Levered Beta</i>
<i>Electric, Value Line</i>						
	Allete, Inc.	0.70	0.70	0.75	0.80	0.80
	Alliant Energy Corp.	0.75	0.70	0.75	0.80	0.80
	Ameren Corp.	0.80	0.80	0.80	0.75	0.75
	American Electric Power Company, Inc.	0.70	0.65	0.70	0.70	0.70
	CenterPoint Energy, Inc.	0.80	0.75	0.80	0.75	0.85
	Cleco Corporation	0.70	0.65	0.70	0.80	0.75
	CMS Energy Corporation	0.75	0.75	0.70	0.70	0.75
	DTE Energy Company	0.75	0.75	0.80	0.75	0.75
	Entergy Corporation	0.70	0.70	0.70	0.70	0.70
	Great Plains Energy Incorporated	0.75	0.75	0.85	0.85	0.85
	ITC Holdings Corp.	0.80	0.75	0.75	0.65	0.70
	MGE Energy Inc.	0.60	0.60	0.65	0.70	0.75
	OGE Energy Corporation	0.80	0.75	0.85	0.90	0.95
	Otter Tail Corporation	0.90	0.90	0.95	0.90	0.85
	The Empire District Electric Company	0.70	0.65	0.70	0.70	0.70
	Vectren Corp.	0.70	0.70	0.70	0.80	0.75
	WEC Energy Group, Inc.	0.65	0.60	0.65	0.65	0.70
	Westar Energy, Inc.	0.75	0.70	0.75	0.75	0.75
	<b>Median</b>	0.75	0.70	0.75	0.75	0.75
	<b>Arithmetic Mean</b>	0.74	0.71	0.75	0.76	0.77

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Fluid Pipeline

## **2016 Capitalization Rate Study Fluid Pipeline (Petroleum Integrated) Industry Notes**

- From the Fluid Pipeline (Petroleum Integrated) Industry segment, Petroleo Brasileiro S.A. (ADR ) (Petrobras) was excluded. While publicly traded, the Brazilian Government is a majority shareholder of common stock. Cenovus Energy Inc., Husky Energy Inc., and Suncor Energy, Inc. were excluded due to Value Line information listed in Canadian dollars.
  
- Staff considered capitalization studies gathered and submitted by:

Enterprise Products Company
  
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Fluid Pipeline (Petroleum Integrated)</i>	12.40%	86.05%	13.95%	11.36%

# Industry Equity Rate Summary

*Fluid Pipeline (Petroleum Integrated)*

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CAPM Ex Post Equity Rate	11.01%
CAPM Ex Ante Equity Rate	15.29%
DCF (Dividend) Equity Rate	12.48%
DCF (Earnings) Equity Rate	7.63%
Earnings Price Ratio	11.36%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Fluid Pipeline (Petroleum Integrated)</i>	9.43%	12.92%	1.23	11.01%	15.29%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Fluid Pipeline (Petroleum Integrated)</b>								
	BP P.L.C. (ADR)	B	105,000,000,000	7.00%	4.00%	1.50%	11.00%	8.50%
	Chevron Corp	A++	168,000,000,000	4.80%	5.00%	2.50%	9.80%	7.30%
	Exxon Mobil Corp.	A++	334,000,000,000	3.60%	4.50%	2.50%	8.10%	6.10%
	Hess Corporation	B+	16,800,000,000	1.70%	10.00%	0.00%	11.70%	
	HollyFrontier Corporation	B++	9,300,000,000	2.70%	11.00%	2.50%	13.70%	5.20%
	Imperial Oil	A+	26,900,000,000	1.40%	0.50%	-1.00%	1.90%	0.40%
	Marathon Petroleum Corp	A+	30,100,000,000	2.30%	15.00%	9.00%	17.30%	11.30%
	Murphy Oil Corporation	B+	4,900,000,000	4.90%	6.00%	-4.00%	10.90%	0.90%
	Occidental Petroleum	A+	56,600,000,000	4.00%	7.50%	0.00%	11.50%	
	Phillips 66	A+	49,200,000,000	2.60%	16.00%	5.00%	18.60%	7.60%
	Royal Dutch Shell (ADR)	A+	157,000,000,000	7.60%	2.00%	3.00%	9.60%	10.60%
	Tesoro Corporation	B+	14,800,000,000	1.70%	20.50%	12.50%	22.20%	14.20%
	Total S.A. (ADR)	A++	112,000,000,000	5.60%	1.00%	1.00%	6.60%	6.60%
	Valero Energy Corp.	A+	35,000,000,000	2.80%	19.00%	10.00%	21.80%	12.80%
<b>Median</b>			42,100,000,000				11.25%	7.45%
<b>Arithmetic Mean</b>			79,971,428,571				12.48%	7.63%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Fluid Pipeline (Petroleum Integrated)</b>						
	BP P.L.C. (ADR)	B	105,000,000,000	34.42	5.00	14.53%
	Chevron Corp	A++	168,000,000,000	90.01	13.50	15.00%
	Exxon Mobil Corp.	A++	334,000,000,000	80.28	9.00	11.21%
	Hess Corporation	B+	16,800,000,000	58.75	2.75	4.68%
	HollyFrontier Corporation	B++	9,300,000,000	50.63	5.75	11.36%
	Imperial Oil	A+	26,900,000,000	31.69	3.35	10.57%
	Marathon Petroleum Corp	A+	30,100,000,000	56.41	7.00	12.41%
	Murphy Oil Corp.	B+	4,900,000,000	28.49	4.00	14.04%
	Occidental Petroleum	A+	56,600,000,000	74.10	5.00	6.75%
	Phillips 66	A+	49,200,000,000	92.17	8.80	9.55%
	Royal Dutch Shell (ADR)	A+	157,000,000,000	49.56	7.25	14.63%
	Tesoro Corporation	B+	14,800,000,000	117.59	10.00	8.50%
	Total S.A. (ADR)	A++	112,000,000,000	48.48	6.65	13.72%
	Valero Energy Corp.	A+	35,000,000,000	72.68	8.75	12.04%
<b>Median</b>			42,100,000,000			11.70%
<b>Arithmetic Mean</b>			79,971,428,571			11.36%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Fluid Pipeline (Petroleum Integrated)</b>							
	BP P.L.C. (ADR)	B	105,000,000,000	48,400,000,000	0.46	68.45%	31.55%
	Chevron Corp	A++	168,000,000,000	35,421,000,000	0.21	82.59%	17.41%
	Exxon Mobil Corp.	A++	334,000,000,000	19,839,000,000	0.06	94.39%	5.61%
	Hess Corporation	B+	16,800,000,000	6,474,000,000	0.39	72.18%	27.82%
	HollyFrontier Corporation	B++	9,300,000,000	982,800,000	0.11	90.44%	9.56%
	Imperial Oil Ltd.	A+	26,900,000,000	4,854,000,000	0.18	84.71%	15.29%
	Marathon Petroleum Corp	A+	30,100,000,000	5,912,000,000	0.20	83.58%	16.42%
	Murphy Oil Corp	B+	4,900,000,000	3,327,700,000	0.68	59.55%	40.45%
	Occidental Petroleum	A+	56,600,000,000	6,882,000,000	0.12	89.16%	10.84%
	Phillips 66	A+	49,200,000,000	8,908,000,000	0.18	84.67%	15.33%
	Royal Dutch Shell (ADR)	A+	157,000,000,000	50,400,000,000	0.32	75.70%	24.30%
	Tesoro Corporation	B+	14,800,000,000	3,791,000,000	0.26	79.61%	20.39%
	Total S.A. (ADR)	A++	112,000,000,000	42,900,000,000	0.38	72.30%	27.70%
	Valero Energy Corp.	A+	35,000,000,000	7,252,000,000	0.21	82.84%	17.16%
<b>Median</b>			42,100,000,000	7,067,000,000	0.21	82.71%	17.29%
<b>Arithmetic Mean</b>			79,971,428,571	17,524,535,714	0.27	80.01%	19.99%
<b>Weighted Average</b>			176,034,833,869	28,543,237,201		86.05%	13.95%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<i>Fluid Pipeline (Petroleum Integrated), Selected Comparables</i>						
	BP P.L.C. (ADR)	1.05	1.05	1.10	1.15	1.20
	Chevron Corp	0.95	0.95	1.00	1.10	1.15
	Exxon Mobil Corp.	0.80	0.80	0.85	0.95	0.95
	Hess Corporation	1.25	1.30	1.25	1.40	1.45
	HollyFrontier Corporation			1.25	1.20	1.20
	Imperial Oil Ltd.	1.15	1.15	1.10	1.15	1.15
	Marathon Petroleum Corp.			1.30	1.20	1.30
	Murphy Oil Corp.	1.20	1.25	1.20	1.25	1.30
	Occidental Petroleum	1.15	1.20	1.15	1.15	1.20
	Phillips 66				1.25	1.35
	Royal Dutch Shell (ADR)	1.05	1.05	1.05	1.05	1.10
	Tesoro Corporation	1.25	1.30	1.20	1.35	1.30
	Total S.A. (ADR)	1.10	1.10	1.15	1.20	1.20
	Valero Energy Corp.	1.30	1.35	1.25	1.30	1.35
<i>Median</i>		1.15	1.15	1.15	1.20	1.20
<i>Arithmetic Mean</i>		1.11	1.14	1.14	1.19	1.23

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<i>Fluid Pipeline (Petroleum Integrated), Value Line</i>						
	BP P.L.C. (ADR)	1.05	1.05	1.10	1.15	1.20
	Cenovus Energy Inc.				1.05	1.05
	Chevron Corp	0.95	0.95	1.00	1.10	1.15
	Exxon Mobil Corp.	0.80	0.80	0.85	0.95	0.95
	Hess Corporation	1.25	1.30	1.25	1.40	1.45
	HollyFrontier Corporation			1.25	1.20	1.20
	Husky Energy, Inc.				0.90	0.95
	Imperial Oil Ltd.	1.15	1.15	1.10	1.15	1.15
	Marathon Petroleum Corp.			1.30	1.20	1.30
	Murphy Oil Corp.	1.20	1.25	1.20	1.25	1.30
	Occidental Petroleum	1.15	1.20	1.15	1.15	1.20
	Petroleo Brasileiro S.A. (ADR) (Petrobras)	1.55	1.55	1.45	1.35	1.55
	Phillips 66				1.25	1.35
	Royal Dutch Shell (ADR)	1.05	1.05	1.05	1.05	1.10
	Suncor Energy, Inc.	1.25	1.30	1.25	1.25	1.20
	Tesoro Corporation	1.25	1.30	1.20	1.35	1.30
	Total S.A. (ADR)	1.10	1.10	1.15	1.20	1.20
	Valero Energy Corp.	1.30	1.35	1.25	1.30	1.35
	<b>Median</b>	1.15	1.20	1.20	1.20	1.20
	<b>Arithmetic Mean</b>	1.16	1.18	1.17	1.18	1.22

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Gas Distribution

## **2016 Capitalization Rate Study Gas Distribution (Natural Gas Utility) Industry Notes**

- From the Natural Gas Utility Industry segment, UGI Corp. was excluded as their primary business involves the marketing and delivery of propane gas.
- Staff considered capitalization studies gathered and submitted by:
  - K.E. Andrews & Co. for Southern Star Central Gas Pipeline, Inc.
  - Tegarden & Associates, Inc. for the Interstate Natural Gas Pipeline Industry
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Gas Distribution (Natural Gas Utility)</i>	9.80%	65.65%	34.35%	8.16%

# Industry Equity Rate Summary

## *Gas Distribution (Natural Gas Utility)*

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CAPM Ex Post Equity Rate	7.57%
CAPM Ex Ante Equity Rate	10.11%
DCF (Dividend) Equity Rate	7.80%
DCF (Earnings) Equity Rate	8.96%
Earnings Price Ratio	6.82%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Gas Distribution (Natural Gas Utility)</i>	9.43%	12.92%	0.73	7.57%	10.11%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Gas Distribution (Natural Gas Utility)</b>								
	AGL Resources, Inc.	A	7,500,000,000	3.30%	4.50%	6.50%	7.80%	9.80%
	Atmos Energy Corporation	A	6,300,000,000	2.70%	5.00%	7.00%	7.70%	9.70%
	Chesapeake Utilities Corporation	B++	825,000,000	2.20%	5.50%	8.50%	7.70%	10.70%
	Laclede Group, Inc.	B++	2,500,000,000	3.40%	4.50%	10.00%	7.90%	13.40%
	New Jersey Resources Corp.	A+	2,700,000,000	3.10%	3.50%	4.00%	6.60%	7.10%
	NiSource Inc.	B+	6,300,000,000	3.10%	-3.50%	-1.50%		1.60%
	Northwest Natural Gas Co.	A	1,300,000,000	3.90%	2.50%	7.00%	6.40%	10.90%
	Piedmont Natural Gas Company	B++	4,600,000,000	2.30%	3.00%	3.00%	5.30%	5.30%
	South Jersey Industries, Inc.	A	1,600,000,000	4.60%	7.00%	7.00%	11.60%	11.60%
	Southwest Gas Corporation	B++	2,700,000,000	3.00%	8.00%	7.00%	11.00%	10.00%
	WGL Holdings, Inc.	A	3,000,000,000	3.00%	3.00%	5.50%	6.00%	8.50%
<b>Median</b>			2,700,000,000				7.70%	9.80%
<b>Arithmetic Mean</b>			3,575,000,000				7.80%	8.96%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Gas Distribution (Natural Gas Utility)</b>						
	AGL Resources, Inc.	A	7,500,000,000	62.62	4.65	7.43%
	Atmos Energy Corporation	A	6,300,000,000	62.38	3.80	6.09%
	Chesapeake Utilities Corporation	B++	825,000,000	53.68	3.70	6.89%
	Laclede Group, Inc.	B++	2,500,000,000	58.27	4.20	7.21%
	New Jersey Resources Corp.	A+	2,700,000,000	31.10	1.95	6.27%
	NiSource Inc.	B+	6,300,000,000	19.75	1.40	7.09%
	Northwest Natural Gas Co.	A	1,300,000,000	47.99	3.30	6.88%
	Piedmont Natural Gas Company	B++	4,600,000,000	57.83	2.10	3.63%
	South Jersey Industries, Inc.	A	1,600,000,000	23.47	2.30	9.80%
	Southwest Gas Corporation	B++	2,700,000,000	56.73	4.50	7.93%
	WGL Holdings, Inc.	A	3,000,000,000	61.03	3.55	5.82%
<b>Median</b>			2,700,000,000			6.89%
<b>Arithmetic Mean</b>			3,575,000,000			6.82%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Gas Distribution (Natural Gas Utility)</b>							
	AGL Resources, Inc.	A	7,500,000,000	3,150,000,000	0.42	70.42%	29.58%
	Atmos Energy Corporation	A	6,300,000,000	2,455,300,000	0.39	71.96%	28.04%
	Chesapeake Utilities Corporation	B++	825,000,000	155,900,000	0.19	84.11%	15.89%
	Laclede Group, Inc.	B++	2,500,000,000	1,771,500,000	0.71	58.53%	41.47%
	New Jersey Resources Corp.	A+	2,700,000,000	843,600,000	0.31	76.19%	23.81%
	NiSource Inc.	B+	6,300,000,000	6,133,500,000	0.97	50.67%	49.33%
	Northwest Natural Gas Co.	A	1,300,000,000	621,700,000	0.48	67.65%	32.35%
	Piedmont Natural Gas Company	B++	4,600,000,000	1,384,500,000	0.30	76.87%	23.13%
	South Jersey Industries, Inc.	A	1,600,000,000	937,400,000	0.59	63.06%	36.94%
	Southwest Gas Corporation	B++	2,700,000,000	1,540,400,000	0.57	63.67%	36.33%
	WGL Holdings, Inc.	A	3,000,000,000	944,200,000	0.31	76.06%	23.94%
<b>Median</b>			2,700,000,000	1,384,500,000	0.42	70.42%	29.58%
<b>Arithmetic Mean</b>			3,575,000,000	1,812,545,455	0.48	69.02%	30.98%
<b>Weighted Average</b>			4,870,963,128	2,548,962,683		65.65%	34.35%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<b>2012</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2013</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2014</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2015</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2016</b> <i>Value Line</i> <i>Levered Beta</i>
<b>Gas Distribution (Natural Gas Utility), Selected Comparables</b>						
	AGL Resources, Inc.	0.75	0.75	0.75	0.80	0.60
	Atmos Energy Corporation	0.70	0.70	0.80	0.80	0.80
	Chesapeake Utilities Corporation					0.65
	Laclede Group, Inc.	0.60	0.55	0.65	0.70	0.70
	New Jersey Resources Corp.	0.65	0.65	0.70	0.80	0.80
	NiSource Inc.	0.85	0.80	0.85	0.85	
	Northwest Natural Gas Co.	0.60	0.55	0.65	0.70	0.65
	Piedmont Natural Gas Co.	0.70	0.65	0.75	0.80	0.75
	South Jersey Industries, Inc.	0.65	0.65	0.70	0.80	0.80
	Southwest Gas Corporation	0.75	0.75	0.80	0.85	0.80
	WGL Holdings, Inc.	0.65	0.65	0.65	0.75	0.75
	<b>Median</b>	0.68	0.65	0.73	0.80	0.75
	<b>Arithmetic Mean</b>	0.69	0.67	0.73	0.79	0.73

### Gas Distribution (Natural Gas Utility), Value Line

	AGL Resources, Inc.	0.75	0.75	0.75	0.80	0.60
	Atmos Energy Corporation	0.70	0.70	0.80	0.80	0.80
	Chesapeake Utilities Corporation					0.65
	Laclede Group, Inc.	0.60	0.55	0.65	0.70	0.70
	New Jersey Resources Corp.	0.65	0.65	0.70	0.80	0.80
	NiSource Inc.	0.85	0.80	0.85	0.85	
	Northwest Natural Gas Co.	0.60	0.55	0.65	0.70	0.65
	Piedmont Natural Gas Co.	0.70	0.65	0.75	0.80	0.75
	South Jersey Industries, Inc.	0.65	0.65	0.70	0.80	0.80
	Southwest Gas Corporation	0.75	0.75	0.80	0.85	0.80
	UGI Corp.	0.70	0.70	0.75	0.85	0.95
	WGL Holdings, Inc.	0.65	0.65	0.65	0.75	0.75
	<b>Median</b>	0.70	0.65	0.75	0.80	0.75
	<b>Arithmetic Mean</b>	0.69	0.67	0.73	0.79	0.75

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Gas Transmission

## **2016 Capitalization Rate Study Gas Transmission (Natural Gas Diversified) Industry Notes**

- From the Gas Transmission Industry segment, Antero Resources Corporation, Cabot Oil & Gas, Chesapeake Energy, Cimarex Energy Co., Concho Resources, Inc., Devon Energy Corp., Encana Corporation, Energen Corporation, Enerplus Corporation, EOG Resources, Inc., Linn Energy, LLC, Newfield Exploration Company, Pengrowth Energy Corporation, QEP Resources, Inc., Southwestern Energy Company, and WPX Energy, Inc. were excluded as they primarily engage in the exploration and production of oil and natural gas. Talisman Energy was acquired by Spanish integrated energy company Repsol, in 2015 and is no longer reported in this Value Line industry segment.
  
- Staff considered capitalization studies gathered and submitted by:
  - K.E. Andrews & Co. for Southern Star Central Gas Pipeline, Inc.
  - Tegarden & Associates, Inc. for the Interstate Natural Gas Pipeline Industry
  
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Gas Transmission (Natural Gas Diversified)</i>	12.00%	73.13%	26.87%	10.11%

# Industry Equity Rate Summary

*Gas Transmission (Natural Gas Diversified)*

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CAPM Ex Post Equity Rate	9.52%
CAPM Ex Ante Equity Rate	13.05%
DCF (Dividend) Equity Rate	9.60%
DCF (Earnings) Equity Rate	11.25%
Earnings Price Ratio	9.71%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Gas Transmission (Natural Gas Diversified)</i>	9.43%	12.92%	1.01	9.52%	13.05%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Gas Transmission (Natural Gas Diversified)</b>								
	EQT Corporation, Inc.	B++	9,000,000,000	0.20%	-10.00%	14.00%		14.20%
	MDU Resources Group, Inc.	A	3,500,000,000	4.20%	4.00%	6.50%	8.20%	10.70%
	National Fuel Gas Company	B++	3,900,000,000	3.40%	5.00%	6.00%	8.40%	9.40%
	Questar Corp.	A	3,300,000,000	4.70%	7.50%	6.00%	12.20%	10.70%
<b>Median</b>			3,700,000,000				8.40%	10.70%
<b>Arithmetic Mean</b>			4,925,000,000				9.60%	11.25%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Gas Transmission (Natural Gas Diversified)</b>						
	EQT Corporation, Inc.	B++	9,000,000,000	59.00	5.20	8.81%
	MDU Resources Group, Inc.	A	3,500,000,000	17.96	2.00	11.14%
	National Fuel Gas Company	B++	3,900,000,000	46.07	4.40	9.55%
	Questar Corp.	A	3,300,000,000	18.76	1.75	9.33%
<b>Median</b>			3,700,000,000			9.44%
<b>Arithmetic Mean</b>			4,925,000,000			9.71%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b><i>Gas Transmission (Natural Gas Diversified)</i></b>							
	EQT Corporation, Inc.	B++	9,000,000,000	2,818,200,000	0.31	76.15%	23.85%
	MDU Resources Group, Inc.	A	3,500,000,000	2,012,400,000	0.57	63.49%	36.51%
	National Fuel Gas Company	B++	3,900,000,000	2,084,000,000	0.53	65.17%	34.83%
	Questar Corp.	A	3,300,000,000	1,004,400,000	0.30	76.67%	23.33%
<b><i>Median</i></b>			3,700,000,000	2,048,200,000	0.42	70.66%	29.34%
<b><i>Arithmetic Mean</i></b>			4,925,000,000	1,979,750,000	0.43	70.37%	29.63%
<b><i>Weighted Average</i></b>			6,058,375,635	2,225,853,807		73.13%	26.87%

## Five Year Historical Beta

Industry	Company	2012	2013	2014	2015	2016
		Value Line Levered Beta				
<b>Gas Transmission (Natural Gas Diversified), Selected Comparables</b>						
	EQT Corporation, Inc.	1.20	1.20	1.15	1.15	1.10
	MDU Resources Group, Inc.	1.00	1.00	1.00	0.95	1.00
	National Fuel Gas Company	1.05	1.00	1.05	1.15	1.10
	Questar Corp.		0.75	0.80	0.80	0.85
	<b>Median</b>	1.05	1.00	1.03	1.05	1.05
	<b>Arithmetic Mean</b>	1.08	0.99	1.00	1.01	1.01

### Gas Transmission (Natural Gas Diversified), Value Line

	Antero Resources Corporation					1.40
	Cabot Oil & Gas	1.25	1.25	1.30	1.05	1.10
	Chesapeake Energy	1.35	1.35	1.40	1.30	1.55
	Cimarex Energy Co.	1.25	1.35	1.40	1.35	1.50
	Concho Resources, Inc.				1.30	1.45
	Devon Energy Corp.	1.20	1.20	1.25	1.20	1.35
	Encana Corporation		1.20	1.15	1.15	1.30
	Energen Corporation	1.15	1.20	1.20	1.30	1.40
	Enerplus Corporation				1.05	1.45
	EOG Resources, Inc.	1.15	1.20	1.25	1.25	1.40
	EQT Corporation, Inc.	1.20	1.20	1.15	1.15	1.10
	Linn Energy, LLC	0.90	0.85	0.85	0.90	1.05
	MDU Resources Group, Inc.	1.00	1.00	1.00	0.95	1.00
	National Fuel Gas Company	1.05	1.00	1.05	1.15	1.10
	Newfield Exploration Company	1.35	1.40	1.40	1.45	1.65
	Pengrowth Energy Corporation	1.25	1.30	1.35	1.30	1.35
	QEP Resources, Inc.		1.35	1.30	1.35	1.45
	Questar Corp.		0.75	0.80	0.80	0.85
	Southwestern Energy Company	1.15	1.15	1.10	1.05	1.20
	WPX Energy, Inc.			1.30	1.35	1.80
	<b>Median</b>	1.20	1.20	1.25	1.20	1.38
	<b>Arithmetic Mean</b>	1.17	1.17	1.19	1.18	1.32

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Oil/Gas Distribution

## **2016 Capitalization Rate Study Oil/Gas Distribution Industry Notes**

- From the Oil/Gas Distribution Industry, Clean Energy Fuels was excluded as they develop and operate fueling stations that supply compressed / liquid natural gas. Enbridge, Inc. and Pembina Pipeline were excluded due to Value Line information listed in Canadian dollars. World Fuel Services was excluded as they are engaged in the marketing and sale of fuel and related products.
  
- Staff considered capitalization studies gathered and submitted by:
  - K.E. Andrews & Co. for Southern Star Central Gas Pipeline, Inc.
  
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Oil/Gas Distribution</i>	13.10%	55.07%	44.93%	9.44%

# Industry Equity Rate Summary

*Oil/Gas Distribution*

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CAPM Ex Post Equity Rate	10.52%
CAPM Ex Ante Equity Rate	14.57%
DCF (Dividend) Equity Rate	17.32%
DCF (Earnings) Equity Rate	18.22%
Earnings Price Ratio	7.85%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Oil/Gas Distribution</i>	9.43%	12.92%	1.16	10.52%	14.57%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Oil/Gas Distribution</b>								
	Cheniere Energy, Inc.	B	11,400,000,000	0.00%	0.00%	0.00%		
	Kinder Morgan, Inc	B++	52,800,000,000	8.60%	9.00%	13.00%	17.60%	21.60%
	ONEOK, Inc.	B+	6,100,000,000	9.00%	12.50%	9.50%	21.50%	18.50%
	Spectra Energy Corp.	B	18,100,000,000	5.50%	8.00%	5.00%	13.50%	10.50%
	Transcanada Corp	A	22,800,000,000	6.50%	4.50%	11.00%	11.00%	17.50%
	Williams Companies, Inc.	B+	27,500,000,000	7.00%	16.00%	16.00%	23.00%	23.00%
<b>Median</b>			20,450,000,000				17.60%	18.50%
<b>Arithmetic Mean</b>			23,116,666,667				17.32%	18.22%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b><i>Oil/Gas Distribution</i></b>						
	Cheniere Energy, Inc.	B	11,400,000,000	48.44	2.00	4.13%
	Kinder Morgan, Inc	B++	52,800,000,000	23.67	1.80	7.60%
	ONEOK, Inc.	B+	6,100,000,000	29.09	2.85	9.80%
	Spectra Energy Corp.	B	18,100,000,000	26.94	2.05	7.61%
	TransCanada Corp.	A	22,800,000,000	32.15	3.85	11.98%
	Williams Companies, Inc.	B+	27,500,000,000	36.65	2.20	6.00%
<b><i>Median</i></b>			20,450,000,000			7.61%
<b><i>Arithmetic Mean</i></b>			23,116,666,667			7.85%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b><i>Oil/Gas Distribution</i></b>							
	Cheniere Energy, Inc.	B	11,400,000,000	15,800,000,000	1.39	41.91%	58.09%
	Kinder Morgan, Inc	B++	52,800,000,000	41,600,000,000	0.79	55.93%	44.07%
	ONEOK, Inc.	B+	6,100,000,000	7,773,800,000	1.27	43.97%	56.03%
	Spectra Energy Corp.	B	18,100,000,000	12,898,000,000	0.71	58.39%	41.61%
	TransCanada Corp	A	22,800,000,000	20,242,500,000	0.89	52.97%	47.03%
	Williams Companies, Inc.	B+	27,500,000,000	21,805,000,000	0.79	55.78%	44.22%
<b><i>Median</i></b>			20,450,000,000	18,021,250,000	0.84	54.37%	45.63%
<b><i>Arithmetic Mean</i></b>			23,116,666,667	20,019,883,333	0.97	51.49%	48.51%
<b><i>Weighted Average</i></b>			32,867,411,680	26,810,673,973		55.07%	44.93%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<i>Oil/Gas Distribution, Selected Comparables</i>						
	Cheniere Energy, Inc.					1.45
	Kinder Morgan, Inc			0.80	0.90	1.00
	ONEOK, Inc.	1.00	0.95	1.05	1.05	1.15
	Spectra Energy Corp.	1.00	1.00	1.00	0.95	1.05
	TransCanada Corp.	0.90	0.85	0.85	0.85	0.95
	Williams Companies, Inc.	1.30			1.00	1.35
<i>Median</i>		1.00	0.95	0.93	0.95	1.10
<i>Arithmetic Mean</i>		1.05	0.93	0.93	0.95	1.16

### *Oil/Gas Distribution, Value Line*

	Cheniere Energy, Inc.					1.45
	Clean Energy Fuels Corp.	1.40	1.40	1.25	1.50	1.60
	Enbridge, Inc.	0.60	0.60	0.60	0.60	0.75
	Kinder Morgan, Inc			0.80	0.90	1.00
	ONEOK, Inc.	1.00	0.95	1.05	1.05	1.15
	Pembina Pipeline Corp.	0.65	0.60	0.55	0.65	0.80
	Spectra Energy Corp.	1.00	1.00	1.00	0.95	1.05
	TransCanada Corp.	0.90	0.85	0.85	0.85	0.95
	Williams Companies, Inc.	1.30			1.00	1.35
	World Fuel Services Corp.			1.00	1.05	1.05
<i>Median</i>		1.00	0.90	0.93	0.95	1.05
<i>Arithmetic Mean</i>		0.98	0.90	0.89	0.95	1.12

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Pipeline MLPs Industry

## 2016 Capitalization Rate Study Pipeline MLPs Industry Notes

- From the Pipeline MLP Industry segment, Value Line Investment Survey reports the merger of MarkWest Energy Partners, L.P. with MPLX L.P. is complete. MarkWest units are no longer trading on the New York Stock Exchange. Suburban Propane was excluded as they are primarily involved in the marketing and distribution of propane gas.
- Staff considered capitalization studies gathered and submitted by:
  - K.E. Andrews & Co for Southern Star Central Gas Pipeline, Inc.
  - Enterprise Products Company
  - Tegarden & Associates, Inc. for the Interstate Natural Gas Pipeline Industry
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Pipeline MLPs</i>	13.50%	63.57%	36.43%	10.39%

# Industry Equity Rate Summary

*Pipeline MLPs*

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CAPM Ex Post Equity Rate	9.05%
CAPM Ex Ante Equity Rate	12.35%
DCF (Dividend) Equity Rate	17.31%
DCF (Earnings) Equity Rate	16.53%
Earnings Price Ratio	10.60%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Pipeline MLPs</i>	9.43%	12.92%	0.95	9.05%	12.35%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Pipeline MLPs</b>								
	Boardwalk Pipeline Partners, L.P.	C++	3,100,000,000	3.20%	-7.00%	11.50%		14.70%
	Buckeye Partners, L.P.	B+	8,600,000,000	7.30%	5.50%	9.50%	12.80%	16.80%
	DCP Midstream Partners, L.P.	B+	2,900,000,000	12.40%	4.00%	5.00%	16.40%	17.40%
	Energy Transfer Partners, L.P.	B++	19,000,000,000	11.10%	4.50%	13.00%	15.60%	24.10%
	EnLink Midstream Partners L.P.	B+	4,900,000,000	10.20%	6.50%	0.00%	16.70%	
	Enterprise Products Partners, L.P.	B+	51,000,000,000	6.30%	8.50%	9.00%	14.80%	15.30%
	Magellan Midstream Partners, L.P.	B++	14,300,000,000	5.20%	13.00%	10.50%	18.20%	15.70%
	ONEOK Partners, L.P.	B++	8,600,000,000	10.50%	4.00%	-0.50%	14.50%	10.00%
	Plains All American Pipeline, L.P.	B+	9,600,000,000	11.80%	8.00%	8.00%	19.80%	19.80%
	Sunoco Logistics Partners, L.P.	B+	7,400,000,000	6.50%	20.50%	8.50%	27.00%	15.00%
	Williams Partners L.P.	B++	17,100,000,000	11.80%	0.00%	0.00%		
<b>Median</b>			8,600,000,000				16.40%	15.70%
<b>Arithmetic Mean</b>			13,318,181,818				17.31%	16.53%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<i>Pipeline MLPs</i>						
	Boardwalk Pipeline Partners, L.P.	C++	3,100,000,000	12.44	2.10	16.88%
	Buckeye Partners, L.P.	B+	8,600,000,000	66.58	5.20	7.81%
	DCP Midstream Partners, L.P.	B+	2,900,000,000	25.17	2.85	11.32%
	Energy Transfer Partners, L.P.	B++	19,000,000,000	37.91	3.20	8.44%
	EnLink Midstream Partners L.P.	B+	4,900,000,000	15.31	1.00	6.53%
	Enterprise Products Partners, L.P.	B+	51,000,000,000	25.42	2.40	9.44%
	Magellan Midstream Partners, L.P.	B++	14,300,000,000	63.00	5.00	7.94%
	ONEOK Parnters, L.P.	B++	8,600,000,000	30.22	2.45	8.11%
	Plains All American Pipeline, L.P.	B+	9,600,000,000	24.05	4.00	16.63%
	Sunoco Logistics Partners, L.P.	B+	7,400,000,000	28.25	2.30	8.14%
	Williams Partners, L.P.	B++	17,100,000,000	29.22	4.50	15.40%
<i>Median</i>			8,600,000,000			8.44%
<i>Arithmetic Mean</i>			13,318,181,818			10.60%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b><i>Pipeline MLPs</i></b>							
	Boardwalk Pipeline Partners, L.P.	C++	3,100,000,000	3,459,200,000	1.12	47.26%	52.74%
	Buckeye Partners, L.P.	B+	8,600,000,000	3,632,800,000	0.42	70.30%	29.70%
	DCP Midstream Partners, L.P.	B+	2,900,000,000	2,179,000,000	0.75	57.10%	42.90%
	Energy Transfer Partners, L.P.	B++	19,000,000,000	27,449,000,000	1.44	40.91%	59.09%
	EnLink Midstream Partners L.P.	B+	4,900,000,000	2,852,000,000	0.58	63.21%	36.79%
	Enterprise Products Partners, L.P.	B+	51,000,000,000	20,840,700,000	0.41	70.99%	29.01%
	Magellan Midstream Partners, L.P.	B++	14,300,000,000	3,407,100,000	0.24	80.76%	19.24%
	ONEOK Partners, L.P.	B++	8,600,000,000	6,145,600,000	0.71	58.32%	41.68%
	Plains All American Pipeline, L.P.	B+	9,600,000,000	9,970,000,000	1.04	49.05%	50.95%
	Sunoco Logistics Partners, L.P.	B+	7,400,000,000	4,944,000,000	0.67	59.95%	40.05%
	Williams Partners, L.P.	B++	17,100,000,000	17,237,000,000	1.01	49.80%	50.20%
<b><i>Median</i></b>			8,600,000,000	4,944,000,000	0.71	58.32%	41.68%
<b><i>Arithmetic Mean</i></b>			13,318,181,818	9,283,309,091	0.76	58.88%	41.12%
<b><i>Weighted Average</i></b>			25,909,692,833	14,848,397,201		63.57%	36.43%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<i>Pipeline MLPs, Selected Comparables</i>						
	Boardwalk Pipeline Partners, L.P.	0.85	0.80	0.70	0.60	0.75
	Buckeye Partners, L.P.	0.80	0.80	0.75	0.70	0.85
	DCP Midstream Partners, L.P.					1.10
	Energy Transfer Partners, L.P.	0.80	0.80	0.75	0.70	0.80
	EnLink Midstream Partners L.P.					1.15
	Enterprise Products Partners, L.P.	0.85	0.85	0.80	0.85	1.00
	Magellan Midstream Partners, L.P.	0.85	0.85	0.80	0.75	0.90
	ONEOK Partners, L.P.					0.85
	Plains All American Pipeline, L.P.	0.85	0.80	0.75	0.75	0.95
	Sunoco Logistics Partners, L.P.					1.05
	Williams Partners, L.P.	1.05	1.05	1.05	0.80	1.00
<b>Median</b>		0.85	0.80	0.75	0.75	0.95
<b>Arithmetic Mean</b>		0.86	0.85	0.80	0.74	0.95

### *Pipeline MLPs, Value Line*

	Boardwalk Pipeline Partners, L.P.	0.85	0.80	0.70	0.60	0.75
	Buckeye Partners, L.P.	0.80	0.80	0.75	0.70	0.85
	DCP Midstream Partners, L.P.					1.10
	Energy Transfer Partners, L.P.	0.80	0.80	0.75	0.70	0.80
	EnLink Midstream Partners L.P.					1.15
	Enterprise Products Partners, L.P.	0.85	0.85	0.80	0.85	1.00
	Magellan Midstream Partners, L.P.	0.85	0.85	0.80	0.75	0.90
	MarkWest Energy Partners, L.P.					0.95
	ONEOK Partners, L.P.					0.85
	Plains All American Pipeline, L.P.	0.85	0.80	0.75	0.75	0.95
	Suburban Propane Partners, L.P.	0.75	0.70	0.70	0.65	0.70
	Sunoco Logistics Partners, L.P.					1.05
	Williams Partners, L.P.	1.05	1.05	1.05	0.80	1.00
<b>Median</b>		0.85	0.80	0.75	0.73	0.95
<b>Arithmetic Mean</b>		0.85	0.83	0.79	0.73	0.93

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

Railroad

## 2016 Capitalization Rate Study Railroad Industry Notes

- From the Railroad Industry segment, American Railcar and Trinity Industries were excluded as they design and manufacture railcars and component parts. GATX was excluded as they specialize in tank, freight car, and locomotive leasing. Greenbrier Companies Inc. was excluded as they design, manufacture, repair, and market railroad freight cars and related equipment.
- Staff considered capitalization studies gathered and submitted by:
  - Union Pacific Railroad
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Railroad</i>	13.15%	82.92%	17.08%	11.75%

# Industry Equity Rate Summary

*Railroad*

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CAPM Ex Post Equity Rate	10.17%
CAPM Ex Ante Equity Rate	14.03%
DCF (Dividend) Equity Rate	14.38%
DCF (Earnings) Equity Rate	13.47%
Earnings Price Ratio	10.17%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Railroad</i>	9.43%	12.92%	1.11	10.17%	14.03%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Railroad</b>								
	Canadian National Railway	A	45,800,000,000	1.60%	14.50%	10.00%	16.10%	11.60%
	Canadian Pacific Railway Limited	B++	21,300,000,000	0.80%	14.50%	17.00%	15.30%	17.80%
	CSX Corp.	B++	26,500,000,000	2.60%	12.00%	11.00%	14.60%	13.60%
	Genesee & Wyoming	B+	4,000,000,000	0.00%	0.00%	15.00%		
	Kansas City Southern, Inc.	A	9,600,000,000	1.50%	14.00%	13.00%	15.50%	14.50%
	Norfolk Southern Corp.	A	26,000,000,000	2.70%	6.50%	8.00%	9.20%	10.70%
	Union Pacific Corporation	A++	72,700,000,000	2.60%	13.00%	10.00%	15.60%	12.60%
<b>Median</b>			26,000,000,000				15.40%	13.10%
<b>Arithmetic Mean</b>			29,414,285,714				14.38%	13.47%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Railroad</b>						
	Canadian National Railway	A	45,800,000,000	57.82	4.80	8.30%
	Canadian Pacific Railway Limited	B++	21,300,000,000	138.58	12.70	9.16%
	CSX Corp.	B++	26,500,000,000	27.17	3.10	11.41%
	Genesee & Wyoming	B+	4,000,000,000	68.85	8.35	12.13%
	Kansas City Southern, Inc.	A	9,600,000,000	88.21	8.20	9.30%
	Norfolk Southern Corp.	A	26,000,000,000	86.97	9.35	10.75%
	Union Pacific Corporation	A++	72,700,000,000	85.10	8.60	10.11%
<b>Median</b>			26,000,000,000			10.11%
<b>Arithmetic Mean</b>			29,414,285,714			10.17%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Railroad</b>							
	Canadian National Railway	A	45,800,000,000	6,978,000,000	0.15	86.78%	13.22%
	Canadian Pacific Railway Limited	B++	21,300,000,000	6,572,000,000	0.31	76.42%	23.58%
	CSX Corp.	B++	26,500,000,000	10,088,000,000	0.38	72.43%	27.57%
	Genesee & Wyoming	B+	4,000,000,000	2,251,000,000	0.56	63.99%	36.01%
	Kansas City Southern, Inc.	A	9,600,000,000	2,319,500,000	0.24	80.54%	19.46%
	Norfolk Southern Corp.	A	26,000,000,000	8,896,000,000	0.34	74.51%	25.49%
	Union Pacific Corporation	A++	72,700,000,000	12,798,000,000	0.18	85.03%	14.97%
<b>Median</b>			26,000,000,000	6,978,000,000	0.31	76.42%	23.58%
<b>Arithmetic Mean</b>			29,414,285,714	7,128,928,571	0.31	77.10%	22.90%
<b>Weighted Average</b>			45,279,407,479	9,324,379,796		82.92%	17.08%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<b><i>Railroad, Selected Comparables</i></b>						
	Canadian National Railway	1.15	1.10	1.10	0.95	0.95
	Canadian Pacific Railway Limited	1.30	1.30	1.25	1.05	1.10
	CSX Corp.	1.20	1.20	1.25	1.15	1.15
	Genesee & Wyoming	1.25	1.25	1.30	1.20	1.30
	Kansas City Southern, Inc.	1.35	1.30	1.25	1.15	1.15
	Norfolk Southern Corp.	1.10	1.10	1.15	1.05	1.05
	Union Pacific Corporation	1.15	1.15	1.15	1.00	1.05
<b><i>Median</i></b>		1.20	1.20	1.25	1.05	1.10
<b><i>Arithmetic Mean</i></b>		1.21	1.20	1.21	1.08	1.11

### ***Railroad, Value Line***

	American Railcar			1.60	1.60	1.45
	Canadian National Railway	1.15	1.10	1.10	0.95	0.95
	Canadian Pacific Railway Limited	1.30	1.30	1.25	1.05	1.10
	CSX Corp.	1.20	1.20	1.25	1.15	1.15
	GATX Corp			1.15	1.15	1.10
	Genesee & Wyoming	1.25	1.25	1.30	1.20	1.30
	Greenbrier Companies Inc.			2.05	2.05	1.95
	Kansas City Southern, Inc.	1.35	1.30	1.25	1.15	1.15
	Norfolk Southern Corp.	1.10	1.10	1.15	1.05	1.05
	Trinity Industries				1.65	1.65
	Union Pacific Corporation	1.15	1.15	1.15	1.00	1.05
<b><i>Median</i></b>		1.20	1.20	1.25	1.15	1.15
<b><i>Arithmetic Mean</i></b>		1.21	1.20	1.33	1.27	1.26

# Mergents 2015 Corporate Bond Yield Averages

<i>Month</i>	<i>Corporate by Groups</i>		<i>Public Utility Bonds</i>			<i>Industrial Bonds</i>			
	<i>Public Utility</i>	<i>Industrial</i>	<i>Aa</i>	<i>A</i>	<i>Baa</i>	<i>Aaa</i>	<i>Aa</i>	<i>A</i>	<i>Baa</i>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	4.38%	4.27%	4.00%	4.12%	5.03%	3.89%	3.99%	4.25%	4.96%

# Telecommunication Services

## **2016 Capitalization Rate Study Telecommunication Services Industry Note**

- From the Telecommunication Services segment, America Movil, Manitoba Telecom Services Inc., TELUS Corporation, and Vodafone Group PLC were excluded due to non-domestic operations. Dycom, Inc. was excluded as they offer engineering, construction, maintenance and installation to telecommunication providers. Gogo Inc. was excluded as they offer wireless services to airlines. Inteliquent, Inc. was excluded as they offer engineering, construction, maintenance, and installation services to telecommunication providers. j2 Global Communications was excluded as they principally offer value-added and tandem interconnection services. NTELOS Holdings Corp is no longer included in this Value Line industry segment.
  
- Staff considered capitalization studies gathered and submitted by:
  - Duff & Phelps – Small Cap Wireline
  - Hal Heaton, PhD for AT&T ILEC
  - Hal Heaton, PhD for AT&T Mobility Operating Property
  - Level 3 Communications, LLC
  
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Telecommunications Services</i>	12.55%	63.40%	36.60%	9.77%

# Industry Equity Rate Summary

*Telecommunications Services*

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CAPM Ex Post Equity Rate	9.71%
CAPM Ex Ante Equity Rate	13.34%
DCF (Dividend) Equity Rate	7.98%
DCF (Earnings) Equity Rate	11.08%
Earnings Price Ratio	6.85%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Telecommunications Services</i>	9.43%	12.92%	1.04	9.71%	13.34%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Telecommunications Services</b>								
	AT&T Inc.	A++	208,000,000,000	5.70%	2.50%	5.50%	8.20%	11.20%
	Atlantic Tele-Network, Inc.	B++	1,300,000,000	1.60%	6.50%	7.00%	8.10%	8.60%
	General Communication, Inc.	C++	850,000,000	0.00%	0.00%	43.00%		
	Shenandoah Telecommunications Company	B	1,200,000,000	1.10%	9.50%	15.50%	10.60%	16.60%
	Sprint Corporation	C++	15,000,000,000	0.00%	0.00%	0.00%		
	Telephone & Data Systems, Inc.	B	3,000,000,000	2.10%	4.00%	4.00%	6.10%	6.10%
	T-Mobile US, Inc.	B	30,100,000,000	0.00%	0.00%	0.00%		
	U.S. Cellular	B+	3,500,000,000	0.00%	0.00%	4.50%		
	Verizon Communications	A++	186,000,000,000	4.90%	2.00%	8.00%	6.90%	12.90%
	Vonage Holdings Corp	B	1,300,000,000	0.00%	0.00%	1.00%		
<b>Median</b>			3,250,000,000				8.10%	11.20%
<b>Arithmetic Mean</b>			45,025,000,000				7.98%	11.08%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Telecommunications Services</b>						
	AT&T Inc.	A++	208,000,000,000	33.85	3.35	9.90%
	Atlantic Tele-Network, Inc.	B++	1,300,000,000	79.28	3.85	4.86%
	General Communication, Inc.	C++	850,000,000	21.68	1.80	8.30%
	Shenandoah Telecommunications Company	B	1,200,000,000	23.90	1.30	5.44%
	Sprint Corporation	C++	15,000,000,000	3.77	0.25	6.63%
	Telephone & Data Systems, Inc.	B	3,000,000,000	28.02	1.00	3.57%
	T-Mobile US, Inc.	B	30,100,000,000	36.89	3.10	8.40%
	U.S. Cellular	B+	3,500,000,000	42.13	1.50	3.56%
	Verizon Communications	A++	186,000,000,000	45.70	4.50	9.85%
	Vonage Holdings Corp	B	1,300,000,000	6.24	0.50	8.01%
<b>Median</b>			3,250,000,000			7.32%
<b>Arithmetic Mean</b>			45,025,000,000			6.85%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Telecommunications Services</b>							
	AT&T Inc.	A++	208,000,000,000	119,395,000,000	0.57	63.53%	36.47%
	Atlantic Tele-Network, Inc.	B++	1,300,000,000	28,100,000	0.02	97.88%	2.12%
	General Communication, Inc.	C++	850,000,000	1,407,000,000	1.66	37.66%	62.34%
	Shenandoah Telecommunications Company	B	1,200,000,000	184,000,000	0.15	86.71%	13.29%
	Sprint Corporation	C++	15,000,000,000	32,570,000,000	2.17	31.53%	68.47%
	Telephone & Data Systems, Inc.	B	3,000,000,000	2,210,000,000	0.74	57.58%	42.42%
	T-Mobile US, Inc.	B	30,100,000,000	24,570,000,000	0.82	55.06%	44.94%
	U.S. Cellular	B+	3,500,000,000	1,368,700,000	0.39	71.89%	28.11%
	Verizon Communications	A++	186,000,000,000	105,060,000,000	0.56	63.90%	36.10%
	Vonage Holdings Corp	B	1,300,000,000	149,000,000	0.11	89.72%	10.28%
<b>Median</b>			3,250,000,000	1,808,500,000	0.57	63.72%	36.28%
<b>Arithmetic Mean</b>			45,025,000,000	28,694,180,000	0.72	65.55%	34.45%
<b>Weighted Average</b>			175,497,617,990	101,313,702,232		63.40%	36.60%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<b>2012</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2013</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2014</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2015</b> <i>Value Line</i> <i>Levered Beta</i>	<b>2016</b> <i>Value Line</i> <i>Levered Beta</i>
<i>Telecommunications Services, Selected Comparables</i>						
	AT&T Inc.	0.75	0.70	0.70	0.75	0.75
	Atlantic Tele-Network, Inc.	0.95	1.00	1.00	1.00	0.95
	General Communications, Inc.	1.15	1.20	1.15	1.10	1.15
	Shenandoah Telecommunications Company	0.80	0.85	0.90	1.05	1.10
	Sprint Corporation	1.30	1.35	1.05	1.15	1.30
	Telephone & Data Systems, Inc.	0.90	0.90	1.05	1.20	1.20
	T-Mobile US, Inc.					1.00
	U.S. Cellular	1.10	1.10	1.00	1.00	1.05
	Verizon Communications	0.70	0.70	0.65	0.70	0.75
	Vonage Holdings Corp.	1.15	1.20	1.20	1.20	1.15
<b>Median</b>		0.95	1.00	1.00	1.05	1.08
<b>Arithmetic Mean</b>		0.98	1.00	0.97	1.02	1.04

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<i>Telecommunications Services, Value Line</i>						
	America Movil, S.A.B. de C.V. (ADR)	1.15	1.15	1.10	1.00	1.00
	AT&T Inc.	0.75	0.70	0.70	0.75	0.75
	Atlantic Tele-Network, Inc.	0.95	1.00	1.00	1.00	0.95
	Dycom Industries, Inc.	1.40	1.40	1.40	1.35	1.25
	General Communications, Inc.	1.15	1.20	1.15	1.10	1.15
	Gogo Inc.					1.20
	Inteliquent, Inc.	1.00	0.95		2.05	1.55
	j2 Global Communications	1.00	0.95	0.90	0.85	0.90
	Manitoba Telecom Services Inc				0.55	0.55
	Shenandoah Telecommunications Company	0.80	0.85	0.90	1.05	1.10
	Sprint Corporation	1.30	1.35	1.05	1.15	1.30
	Telephone & Data Systems, Inc.	0.90	0.90	1.05	1.20	1.20
	TELUS Corporation	0.60	0.55	0.50	0.50	0.55
	T-Mobile US, Inc.					1.00
	U.S. Cellular	1.10	1.10	1.00	1.00	1.05
	Verizon Communications	0.70	0.70	0.65	0.70	0.75
	Vodafone Group PLC (ADR)	0.80	0.75	0.85		1.10
	Vonage Holdings Corp.	1.15	1.20	1.20	1.20	1.15
<b>Median</b>		1.00	0.95	1.00	1.00	1.08
<b>Arithmetic Mean</b>		0.98	0.98	0.96	1.03	1.03

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

# Telecommunications Utility

## **2016 Capitalization Rate Study Telecommunications Utility Industry Notes**

- From the Telecommunication Utility segment, BCE Inc., BT Group PLC, Deutsche Telekom AG., and Telefonica, S.A. were excluded due to primarily non-domestic operations.
  
- Staff considered capitalization studies gathered and submitted by:
  - Duff & Phelps – Small Cap Wireline
  - Hal Heaton, PhD for AT&T ILEC
  - Hal Heaton, PhD for AT&T Mobility Operating Property
  - Level 3 Communications, LLC
  
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Telecommunications Utility</i>	13.30%	40.28%	59.72%	8.36%

# Industry Equity Rate Summary

*Telecommunications Utility*

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CAPM Ex Post Equity Rate	9.17%
CAPM Ex Ante Equity Rate	12.53%
DCF (Dividend) Equity Rate	11.00%
DCF (Earnings) Equity Rate	28.23%
Earnings Price Ratio	9.42%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Telecommunications Utility</i>	9.43%	12.92%	0.96	9.17%	12.53%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

Value Line Investment Survey, November 2015 through January 2016, Morningstar

# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Telecommunications Utility</b>								
	CenturyLink, Inc.	B++	14,600,000,000	8.10%	0.00%	9.50%		17.60%
	Cincinnati Bell	C+	775,000,000	0.00%	0.00%	0.00%		
	Consolidated Communication Holdings, Inc	C++	1,100,000,000	7.10%	0.00%	25.50%		32.60%
	Frontier Communications Corporation	B	5,800,000,000	8.50%	2.50%	26.00%	11.00%	34.50%
	Windstream Holdings	C+	650,000,000	9.40%	0.00%	0.00%		
<b>Median</b>			1,100,000,000				11.00%	32.60%
<b>Arithmetic Mean</b>			4,585,000,000				11.00%	28.23%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Telecommunications Utility</b>						
	CenturyLink, Inc.	B++	14,600,000,000	26.54	3.25	12.25%
	Cincinnati Bell	C+	775,000,000	3.74	0.30	8.02%
	Consolidated Communication Holdings, Inc	C++	1,100,000,000	21.87	1.60	7.32%
	Frontier Communications Corporation	B	5,800,000,000	4.95	0.50	10.10%
	Windstream Holdings	C+	650,000,000	6.36	0.60	9.43%
<b>Median</b>			1,100,000,000			9.43%
<b>Arithmetic Mean</b>			4,585,000,000			9.42%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Telecommunications Utility</b>							
	CenturyLink, Inc.	B++	14,600,000,000	18,504,000,000	1.27	44.10%	55.90%
	Cincinnati Bell	C+	775,000,000	1,236,300,000	1.60	38.53%	61.47%
	Consolidated Communication Holdings, Inc	C++	1,100,000,000	1,406,300,000	1.28	43.89%	56.11%
	Frontier Communications Corporation	B	5,800,000,000	16,016,000,000	2.76	26.59%	73.41%
	Windstream Holdings	C+	650,000,000	5,693,400,000	8.76	10.25%	89.75%
<b>Median</b>			1,100,000,000	5,693,400,000	1.60	38.53%	61.47%
<b>Arithmetic Mean</b>			4,585,000,000	8,571,200,000	3.13	32.67%	67.33%
<b>Weighted Average</b>			10,862,949,836	16,107,174,373		40.28%	59.72%

## Five Year Historical Beta

Industry	Company	2012	2013	2014	2015	2016
		Value Line Levered Beta				
<i>Telecommunications Utility, Selected Comparables</i>						
	CenturyLink, Inc.	0.75	0.75	0.75	0.75	0.90
	Cincinnati Bell	1.05	1.05	1.05	1.15	1.15
	Consolidated Communications Holdings, Inc	0.90	0.85	0.80	0.75	0.75
	Frontier Communications Corp.	0.90	0.95	0.90	0.90	1.05
	Windstream Holdings	0.90	0.90	0.90	0.90	
	<b>Median</b>	0.90	0.90	0.90	0.90	0.98
	<b>Arithmetic Mean</b>	0.90	0.90	0.88	0.89	0.96

### *Telecommunications Utility, Value Line*

	BCE Inc	0.75	0.70	0.70	0.70	0.70
	BT Group PLC (ADR)	1.00	1.00	1.05	1.10	1.05
	CenturyLink, Inc.	0.75	0.75	0.75	0.75	0.90
	Cincinnati Bell	1.05	1.05	1.05	1.15	1.15
	Consolidated Communications Holdings, Inc	0.90	0.85	0.80	0.75	0.75
	Deutsche Telekom AG (ADR)	0.80	0.80	0.90	1.00	1.05
	Frontier Communications Corp.	0.90	0.95	0.90	0.90	1.05
	Telefonica, S.A. (ADR)	0.90	0.95	1.00	1.15	1.10
	Windstream Holdings	0.90	0.90	0.90	0.90	
	<b>Median</b>	0.90	0.90	0.90	0.90	1.05
	<b>Arithmetic Mean</b>	0.88	0.88	0.89	0.93	0.97

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>

Water

## **2016 Capitalization Rate Study Water Industry Notes**

- From the Water Industry segment, Consolidated Water Company was excluded as being primarily involved in non-domestic operations.
- Staff considered capitalization studies gathered and submitted by:
  - No Submissions
- Staff relied upon the results of the following models and appraisal judgment in the development of equity rates:
  1. Discounted Cash Flow
  2. Capital Asset Pricing Model, Ex-Post and Ex Ante
  3. Earnings/Price Ratio

# Industry Capitalization Rate

<i>Industry</i>	<i>Equity Rate</i>	<i>Market Capitalization</i>	<i>Long Term Debt</i>	<i>Capitalization Rate</i>
<i>Water</i>	9.85%	66.59%	33.41%	8.24%

# Industry Equity Rate Summary

*Water*

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CAPM Ex Post Equity Rate	7.49%
CAPM Ex Ante Equity Rate	10.00%
DCF (Dividend) Equity Rate	9.28%
DCF (Earnings) Equity Rate	8.21%
Earnings Price Ratio	5.56%

# CAPM Equity Rates

<i>Industry</i>	<i>Ex Post Risk Premium b*</i>	<i>Ex Ante Risk Premium c*</i>	<i>Value Line Beta d</i>	<i>Ex Post CAPM EquityRate (((b-2.53%)*d)+2.53%)</i>	<i>Ex Ante CAPM EquityRate (((c-2.53%)*d)+2.53%)</i>
<i>Water</i>	9.43%	12.92%	0.72	7.49%	10.00%

b\* Risk Free Rate (2.53%) plus Risk Premium Rate (6.90%)

c\* Risk Free Rate (2.53%) plus Risk Premium Rate (10.39%)

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# Discounted Cash Flow (Gordon Growth)

Industry	Company	Value Line Strength	Market Capitalization d	Dividend Yield e	Growth Estimate		Equity Rate Dividend (e+f)	Equity Rate Earnings (e+g)
					Dividends f	Earnings g		
<b>Water</b>								
	American States Water Co.	A	1,500,000,000	2.30%	7.50%	6.00%	9.80%	8.30%
	American Water Works Company, Inc.	B+	10,800,000,000	2.40%	8.50%	7.00%	10.90%	9.40%
	Aqua America, Inc.	A	5,200,000,000	2.50%	9.50%	7.50%	12.00%	10.00%
	California Water Service Group	B++	1,100,000,000	3.00%	7.00%	6.50%	10.00%	9.50%
	Connecticut Water	B+	425,000,000	2.80%	5.00%	4.50%	7.80%	7.30%
	Middlesex Water Company	B++	425,000,000	3.00%	3.00%	5.00%	6.00%	8.00%
	SJW Corporation	B+	600,000,000	2.70%	6.00%	1.50%	8.70%	4.20%
	York Water Company	B+	325,000,000	2.50%	6.50%	6.50%	9.00%	9.00%
<b>Median</b>			850,000,000				9.40%	8.65%
<b>Arithmetic Mean</b>			2,546,875,000				9.28%	8.21%

# E/P Ratio

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Recent Price d</i>	<i>Projected Earnings e</i>	<i>E/P Ratio (e/d)</i>
<b>Water</b>						
	American States Water Co.	A	1,500,000,000	40.79	2.15	5.27%
	American Water Works Company, Inc.	B+	10,800,000,000	60.15	3.25	5.40%
	Aqua America, Inc.	A	5,200,000,000	29.65	1.65	5.56%
	California Water Service Group	B++	1,100,000,000	23.24	1.55	6.67%
	Connecticut Water	B+	425,000,000	38.47	2.25	5.85%
	Middlesex Water Company	B++	425,000,000	26.23	1.35	5.15%
	SJW Corporation	B+	600,000,000	29.52	1.75	5.93%
	York Water Company	B+	325,000,000	24.84	1.15	4.63%
<b>Median</b>			850,000,000			5.48%
<b>Arithmetic Mean</b>			2,546,875,000			5.56%

# Capital Structure

<i>Industry</i>	<i>Company</i>	<i>Value Line Strength</i>	<i>Market Capitalization c</i>	<i>Long Term Debt d</i>	<i>Debt/Equity Ratio (d/c)</i>	<i>Percentage Equity (c/(c+d))</i>	<i>Percentage Debt (d/(c+d))</i>
<b>Water</b>							
	American States Water Co.	A	1,500,000,000	325,600,000	0.22	82.16%	17.84%
	American Water Works Company, Inc.	B+	10,800,000,000	5,940,600,000	0.55	64.51%	35.49%
	Aqua America, Inc.	A	5,200,000,000	1,681,100,000	0.32	75.57%	24.43%
	California Water Service Group	B++	1,100,000,000	416,400,000	0.38	72.54%	27.46%
	Connecticut Water	B+	425,000,000	176,700,000	0.42	70.63%	29.37%
	Middlesex Water Company	B++	425,000,000	135,200,000	0.32	75.87%	24.13%
	SJW Corporation	B+	600,000,000	381,000,000	0.64	61.16%	38.84%
	York Water Company	B+	325,000,000	87,300,000	0.27	78.83%	21.17%
<b>Median</b>			850,000,000	353,300,000	0.35	74.05%	25.95%
<b>Arithmetic Mean</b>			2,546,875,000	1,142,987,500	0.39	72.66%	27.34%
<b>Weighted Average</b>			7,262,177,914	3,643,493,006		66.59%	33.41%

## Five Year Historical Beta

<i>Industry</i>	<i>Company</i>	<i>2012 Value Line Levered Beta</i>	<i>2013 Value Line Levered Beta</i>	<i>2014 Value Line Levered Beta</i>	<i>2015 Value Line Levered Beta</i>	<i>2016 Value Line Levered Beta</i>
<b><i>Water, Selected Comparables</i></b>						
	American States Water Co.	0.70	0.70	0.65	0.70	0.70
	American Water Works Company, Inc.	0.65	0.65	0.65	0.70	0.70
	Aqua America, Inc.	0.65	0.60	0.60	0.70	0.75
	California Water Service Group	0.65	0.65	0.60	0.70	0.75
	Connecticut Water		0.75	0.75	0.65	0.65
	Middlesex Water Company	0.70	0.70	0.75	0.70	0.70
	SJW Corporation	0.85	0.85	0.85	0.85	0.75
	York Water Company			0.70	0.65	0.75
<b><i>Median</i></b>		0.68	0.70	0.68	0.70	0.73
<b><i>Arithmetic Mean</i></b>		0.70	0.70	0.69	0.71	0.72

### ***Water, Value Line***

	American States Water Co.	0.70	0.70	0.65	0.70	0.70
	American Water Works Company, Inc.	0.65	0.65	0.65	0.70	0.70
	Aqua America, Inc.	0.65	0.60	0.60	0.70	0.75
	California Water Service Group	0.65	0.65	0.60	0.70	0.75
	Connecticut Water		0.75	0.75	0.65	0.65
	Consolidated Water Co. Ltd			1.00	0.90	0.85
	Middlesex Water Company	0.70	0.70	0.75	0.70	0.70
	SJW Corporation	0.85	0.85	0.85	0.85	0.75
	York Water Company			0.70	0.65	0.75
<b><i>Median</i></b>		0.68	0.70	0.70	0.70	0.75
<b><i>Arithmetic Mean</i></b>		0.70	0.70	0.73	0.73	0.73

# Mergents 2015 Corporate Bond Yield Averages

<b>Month</b>	<b>Corporate by Groups</b>		<b>Public Utility Bonds</b>			<b>Industrial Bonds</b>			
	<b>Public Utility</b>	<b>Industrial</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>	<b>Aaa</b>	<b>Aa</b>	<b>A</b>	<b>Baa</b>
January	3.83%	3.84%	3.52%	3.58%	4.39%	3.46%	3.55%	3.82%	4.51%
February	3.91%	3.94%	3.62%	3.67%	4.44%	3.61%	3.65%	3.94%	4.57%
March	3.97%	3.97%	3.67%	3.74%	4.51%	3.64%	3.72%	3.96%	4.56%
April	3.96%	3.88%	3.63%	3.75%	4.51%	3.52%	3.65%	3.89%	4.45%
May	4.38%	4.31%	4.05%	4.17%	4.91%	3.98%	4.09%	4.30%	4.86%
June	4.60%	4.52%	4.29%	4.39%	5.13%	4.19%	4.25%	4.51%	5.12%
July	4.63%	4.51%	4.27%	4.40%	5.22%	4.15%	4.22%	4.49%	5.18%
August	4.54%	4.42%	4.13%	4.25%	5.23%	4.04%	4.11%	4.39%	5.15%
September	4.68%	4.49%	4.25%	4.39%	5.42%	4.07%	4.16%	4.46%	5.25%
October	4.63%	4.40%	4.13%	4.29%	5.47%	3.95%	4.08%	4.37%	5.21%
November	4.73%	4.51%	4.22%	4.40%	5.57%	4.06%	4.20%	4.45%	5.34%
December	4.69%	4.47%	4.16%	4.35%	5.55%	3.97%	4.16%	4.40%	5.36%
	<b>4.38%</b>	<b>4.27%</b>	<b>4.00%</b>	<b>4.12%</b>	<b>5.03%</b>	<b>3.89%</b>	<b>3.99%</b>	<b>4.25%</b>	<b>4.96%</b>